Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Canceled)

2. (New) A method for correcting an algebraic-coded message, comprising:

determining the existence of errors using inversionless calculations on a syndrome polynomial of the algebraic-coded message that includes redundancies usable to determine an existence of errors, a location and magnitude of errors and discrepancy values;

if the existence of errors has been determined, determining the location and magnitude of the errors and the discrepancy values using inversionless calculations, storing the location and magnitude of errors in an error locator variable capable of storing polynomials and storing the discrepancy values in a number of discrepancy variables;

using a number of copies of the error locator variable to store different versions reflecting different states of progress of the inversionless calculations to allow calculations requiring results formerly calculated and stored in the error locator variable as an input after the error locator variable has already been updated;

setting a state variable capable of storing binary states before a first iteration to indicate that no uncorrectable error has been detected and iterating through the errors while updating the state variable to indicate whether an uncorrectable error has been detected;

indicating that the algebraic-coded message is uncorrectable if the state variable contains an indication that an uncorrectable error has been detected after a final iteration;

indicating that the algebraic-coded message is not uncorrectable if the existence of no errors has been determined or the state variable contains an indication that no uncorrectable error has been detected after the final iteration; and

correcting the errors using inversionless calculations and the location and magnitude of errors stored in the error locator variable and the discrepancy values stored in the discrepancy variables.

3. (New) The method of claim 2, further comprising temporarily storing the discrepancy values in a first discrepancy variable and a second discrepancy variable, storing in the second discrepancy variable temporarily the last value previously stored in the first discrepancy variable.

4. (New) The method of claim 2, wherein the state variable is a Boolean variable.

5. (New) The method of claim 2, further comprising using two as the number of copies of the error locator variable.

6. (New) The method of claim 5, wherein the first copy of the error locator variable is a temporary error locator variable storing an updated polynomial while the error locator variable is still used for further calculations; and

the second copy of the error locator variable is a secondary error locator variable temporarily storing a previous value of the error locator variable used for calculations after the error locator variable has been updated.

7. (New) An apparatus for correcting an algebraic-coded message comprising:

a syndrome polynomial receiver receiving an uncorrected syndrome polynomial of the algebraic-coded message that includes redundancies usable to determine an existence of errors, a location and magnitude of errors and discrepancy values;

a plurality of polynomial storage devices being adapted to store polynomials;

a plurality of discrepancy value storage devices being adapted to store discrepancy values;

a syndrome polynomial producer being adapted to produce a corrected syndrome polynomial of the algebraic coded message;

one or more arithmetic-logic components, operably connected to the polynomial storage devices, the discrepancy value storage devices, the syndrome polynomial receiver, and the syndrome polynomial producer; and

an inversionless calculator, operably connected to the polynomial storage devices, the discrepancy value storage devices, the syndrome polynomial receiver, the syndrome polynomial producer, and the arithmetic-logic components,

wherein the inversionless calculator corrects errors in the uncorrected syndrome polynomial, resulting in a corrected syndrome polynomial, using inversionless calculations and using the polynomial storage devices to store different states of progress of the inversionless calculations and the discrepancy value storage devices to store discrepancy values discovered in the uncorrected syndrome polynomial, and

wherein the inversionless calculator produces the corrected syndrome polynomial using the syndrome polynomial producer.

8. (New) The apparatus of claim 7, further comprising:

a binary state storage device being adapted to store a binary state, operably connected to the inversionless calculator and the arithmetic-logic components;

an uncorrectable error indicator, operably connected to the inversionless calculator and the arithmetic-logic components; and

wherein the inversionless calculator iterates through the location of errors in the uncorrected syndrome polynomial, while:

determining the existence of errors, the location and magnitude of the errors and the discrepancy values in the uncorrected syndrome polynomial,

storing a state variable in the binary state storage device before a first iteration to indicate that no uncorrectable error has been detected and iterating through the errors while updating the state variable to indicate whether an uncorrectable error has been detected,

using the uncorrectable error indicator to indicate that the algebraic-coded message is uncorrectable if the state variable contains an indication that an uncorrectable error has been detected after a final iteration, and

using the uncorrectable error indicator to indicate that the algebraic-coded message is not uncorrectable if the existence of no errors has been determined or the state variable contains an indication that no uncorrectable error has been detected after the final iteration.

9. (New) The apparatus of claim 7, wherein the inversionless calculator temporarily stores the discrepancy values in a first discrepancy variable and a second discrepancy variable, storing in the second discrepancy variable temporarily the last value previously stored in the first discrepancy variable.

10. (New) The apparatus of claim 8, wherein the binary state storage device is adapted to store a Boolean variable.

11. (New) The apparatus of claim 7, wherein the plurality of polynomial storage devices is three.

12. (New) The apparatus of claim 11, wherein the first polynomial storage device stores the current state of progress of the inversionless calculations;

the second polynomial storage device stores a resulting state of the current inversionless calculations useable in a next iteration of the inversionless calculator; and

the third polynomial storage device stores a previous state of the inversionless calculations.

13. (New) A computer program product recorded on a computer readable medium for correcting an algebraic-coded message, comprising:

computer readable program code with a software interface for receiving an uncorrected syndrome polynomial data structure of the algebraic-coded message, including redundancies usable to determine an existence of errors, a location and magnitude of errors and discrepancy values, and for producing a corrected syndrome polynomial data structure;

computer readable program code determining the existence of errors, the location and magnitude of errors and the discrepancy values in the uncorrected syndrome polynomial data structure using inversionless calculations, storing the location and magnitude of errors in an error locator variable capable of storing polynomials and storing the discrepancy values in a number of discrepancy variables;

computer readable program code using a number of copies of the error locator variable to store different versions reflecting different states of progress of the inversionless

calculations to allow calculations requiring results formerly calculated and stored in the error locator variable as an input after the error locator variable has already been updated;

computer readable program code setting a state variable capable of storing binary states before a first iteration to indicate that no uncorrectable error has been detected and iterating through the errors while updating the state variable to indicate whether an uncorrectable error has been detected;

computer readable program code indicating that the algebraic-coded message is uncorrectable if the state variable contains an indication that an uncorrectable error has been detected after a final iteration;

computer readable program code indicating that the algebraic-coded message is not uncorrectable if the existence of no errors has been determined or the state variable contains an indication that no uncorrectable error has been detected after the final iteration; and

computer readable program code correcting errors in the uncorrected syndrome polynomial data structure using inversionless calculations and the location and magnitude of errors stored in the error locator variable and the discrepancy values stored in the discrepancy variables, and producing a corrected syndrome polynomial data structure using the software interface.

14. (New) The computer program product of claim 13, wherein the computer readable program code temporarily stores the discrepancy values in a first discrepancy variable and a

second discrepancy variable, storing in the second discrepancy variable temporarily the last value previously stored in the first discrepancy variable.

15. (New) The computer program product of claim 13, wherein the computer readable program code uses a Boolean variable as the state variable.

16. (New) The computer program product of claim 13, wherein the computer readable program code uses two as the number of copies of the error locator variable.

17. (New) The computer program product of claim 16, wherein the first copy of the error locator variable is a temporary error locator variable storing an updated polynomial while the error locator variable is still used for further calculations; and

the second copy of the error locator variable is a secondary error locator variable temporarily storing a previous value of the error locator variable used for calculations after the error locator variable has been updated.